**TOXINS REVIEW**: **Lessons 1-6, 24**

**LESSON 1**: CHEMICAL EQUATIONS

1. In the chemical equation to the right: **2HCl*(aq)* + Cr*(s)* 🡪 CrCl2*(aq)* + H2*(g)***
   1. What are the reactants?
   2. What are the products?
   3. What do *aq*, *s,* and *g* indicate?
   4. What is the purpose of a chemical equation?
2. What is a toxic substance? List 3 effects they have on the body.

**LESSON 2**: OBSERVING CHANGE

1. Describe in words what you would ***observe*** in each of the following changes:
   1. NaCl(s) 🡪 NaCl(aq)
   2. 2NaCl(l) 🡪 2Na(l) + Cl2(g)
   3. 2NaCl(aq) + 2H2O(l) 🡪 2NaOH(aq) + Cl2(g) + H2(g)
2. What information is provided in a chemical equation that cannot be physically observed?
3. What information must be physically observed and is not present in a chemical equation?
4. Write a chemical equation for:
   1. Solid MgS dissolves.
   2. Gaseous methane (CH4) and gaseous oxygen (O2) produce carbon dioxide gas and liquid water.

**LESSON 3:** PHYSICAL VERSUS CHEMICAL CHANGE

1. Describe the difference between a physical and a chemical change.
2. Describe the difference between sugar decomposing and sugar melting.
3. Why is dissolving considered both a physical and a chemical change?
4. Classify each example below as physical or chemical:
   1. Mg(s) + 2HCl(aq) 🡪 H2(g) + MgCl2(aq)
   2. NaCl(s) 🡪 NaCl(l)
   3. A fork is bent.
   4. 2H2O2(aq) 🡪 2H2O(l) + O2(g)
   5. MgCl2(s) 🡪 MgCl2(aq)
   6. A piece of iron rusts.
   7. CO2(s) 🡪 CO2(g)
   8. NaCl(s) 🡪 Na+(aq) + Cl-(aq)
   9. Kindling burns.
   10. Food digests in the stomach.
   11. A piece of metal is magnetized.
   12. A water molecule decomposes.
5. What are three observations that indicate a chemical change might be taking place?

**LESSON 4:** CONSERVATION OF MASS

1. Define the law of conservation of mass.
2. 2H2(g) + O2(g) 🡪 2H2O(l)
   1. If the combined mass of the reactants is 10 grams, how many grams of water will be produced?
   2. If the mass of the hydrogen gas is 4 grams and the mass of the water is 6 grams, what is the mass of the oxygen gas?
3. 2HCl(aq) + Mg(s) 🡪 H2(g) + MgCl2(aq)

a) The reaction above is carried out in a closed container. The mass of the reactants is

8 grams. What is the mass of the products?

b) The reaction above is carried out in an open container. Will the mass of the products

be greater than or less than 8 grams? Why?

**LESSON 5:** BALANCING CHEMICAL EQUATIONS

Balance each equation below:

1. \_\_\_\_ NaBr + \_\_\_\_ Ca(OH)2 🡪 \_\_\_ CaBr2 + \_\_\_\_ NaOH
2. \_\_\_\_ NH3+ \_\_\_\_ H2SO4 🡪 \_\_\_\_ (NH4)2SO4
3. \_\_\_\_ C5H9O + \_\_\_\_ O2 🡪 \_\_\_\_ CO2 + \_\_\_\_ H2O
4. \_\_\_\_ Pb + \_\_\_\_ H3PO4 🡪 \_\_\_\_ H2 + \_\_\_\_ Pb3(PO4)2
5. \_\_\_\_ Li3N + \_\_\_\_ NH4NO3 🡪 \_\_\_ LiNO3 + \_\_\_ (NH4)3N

1. \_\_\_\_ HBr + \_\_\_ Al(OH)3 🡪 \_\_\_ H­2O + \_\_\_ AlBr3

**LESSON 6:** TYPES OF REACTIONS

Identify the type of reaction for each example below:

1. Na3PO4 + 3KOH 🡪 3NaOH + K3PO4 Reaction Type
2. MgCl2 + Li2CO3 🡪 MgCO3 + 2LiCl Reaction Type
3. Pb + FeSO4 🡪 PbSO4 + Fe Reaction Type
4. CaCO3 🡪 CaO + CO2 Reaction Type
5. P4 + 3O2 🡪 2P2O3 Reaction Type
6. 2RbNO3 + BeF2 🡪 Be(NO3)2 + 2RbF Reaction Type
7. 2AgNO3 + Cu 🡪 Cu(NO3)2 + 2Ag Reaction Type
8. 2C5H5 + Fe 🡪 Fe(C5H5)2 Reaction Type
9. SeCl6 + O2 🡪 SeO2 + 3Cl2 Reaction Type
10. O3 🡪 O. + O2 Reaction Type

**LESSON 24:** MOLE RATIOS

1. Use the following reaction to answer each question below:

**2CH4O + O2 🡪 2CH2O + 2H2O**

a. How many moles of each reactant are needed to make 8 mol H2O?

b. How many moles of O2 are needed to completely react with 6 mol CH4O?

c. If 16 mol CH4O react with 8 mol O2, how many moles of each product will form?

d. If 20 mol CH4O react with 12 mol O2, how many moles of each product will form?

(\*Hint: O2 is in excess. How much excess O2 is left over?)

1. **2KCl + 3O2 🡪2KClO3**

a) Fill in the missing coefficients to maintain the correct mole ratio.

\_\_ KCl + 12O2 🡪 \_\_ KClO3 6KCl + \_\_\_O2 🡪 \_\_ KClO3

b) Which reactant is in excess if 25 mol KCl combine with 30 mol O2? How much is left over?